

AMERICAN ASTRONOMICAL SOCIETY ABSTRACT FORM

The "New" IAU Time Scale, TCB: Nothing New

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Contrary to **inferences** and statements made in the published literature, conversion of the **J2000** reference system to the newly-defined (IAU 1991) coordinate time, TCB, would do nothing to increase the accuracy of handling astronomical measurements. In fact, an exact equivalent of TCB has been used over the past 25 years in the JPL planetary ephemerides, even though it has been called "ET" at first, and then "TDB" later. It is true that ET and TDB are defined in other, non-rigorous ways; however, the argument of the ephemerides has always been treated as a **true** coordinate time in practice. It differs from TCB by only a constant rate.

The ephemerides at JPL are created by numerically integrating the relativistic equations of motion, cast in an inertial, solar-system barycentric frame. As such, the independent variable must necessarily be a true coordinate time. It would be virtually impossible to do what others have erroneously assumed: use TDB, as it is strictly defined, for the argument of the dynamical equations of motion.

Conversion between the time of the ephemerides and TAI, needed for the reduction of observations, may continue to be done either through the use of an integrated time ephemeris (see Fukushima 1994) or by-means of analytical expressions (Moyer 1981, Hirayama et al. 1987, or Fairhead and Bretagnon 1990).

Fairhead, L. and Bretagnon, P.: 1990, "An analytical formula for the time transformation TB-TT", *Astron. Astrophys.*, 229, 240-247.

Fukushima, T.: 1994, "Time Ephemeris", to be submitted.

Hirayama, Th., Kinoshita, H., Fujimoto, M.-K. and Fukushima, T.: 1987, "Analytical Expression of TDB-TDT", *Proc. IAG Symposia at IUGG XIX General Assembly, Tome I*, 91-100.

Moyer, T.D.: 1981, "Transformation from Proper Time on Earth to Coordinate Time in Solar System Barycentric Space-Time Frame of Reference", *Cel. Mech.*, 23, #1, 33-68.

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